

WHAT IS CLAIMED IS:

1 1. A method for determining a bad link in a ring of linked devices including a
2 start-up device and plurality of linked devices with each device in the ring including a
3 receiver and a transmitter, with the receiver of a particular device coupled to the transmitter
4 of a preceding device in the ring and with the transmitter of the particular device coupled to
5 the receiver of a following device in the ring, the method comprising the steps of:
6 at the start-up device:
7 transmitting a transmitted position command having a device number field
8 holding an initial value;
9 receiving a received position command having a device number field holding
10 a received value
11 indicating that all links are good if the received value is equal to an expected
12 value;
13 indicating that a link is bad if the received value is not equal to the expected
14 value and indicating the location in the ring of a bad link based on the difference between the
15 received value and the expected value;
16 at a linked device:
17 incrementing a value held in the device number field of a received position
18 command to form an incremented value and transmitting a modified position command
19 having a device number field holding the incremented value if a position command is
20 received; and
21 transmitting a position command having a device number field holding the
22 initial value if no valid position command is received.

1 2. The method of claim 1 where the all the devices on the management ring
2 are disposed on a platform and the platform includes a storage device indicating the number
3 of devices disposed on the platform, the method further comprising:
4 at the start-up device:
5 reading the storage device to read a platform value indicating the number of
6 devices in the ring; and
7 comparing the received value to the platform value to determine the location
8 of a defective link.

1 3. A method for determining a bad link in a ring of linked devices including a
2 start-up device and plurality of linked devices with each device in the ring including a
3 receiver and a transmitter, with the receiver of a particular device coupled to the transmitter
4 of a preceding device in the ring and with the transmitter of the particular device coupled to
5 the receiver of a following device in the ring, the method comprising the steps of:
6 at the start-up device:
7 starting a timer;
8 transmitting an INIT command having a device number field holding an initial
9 value;
10 indicating that all links are good if the timer has not expired and if an INIT
11 command is received;
12 if the timer has expired and no INIT command is received:
13 storing a received link number field;
14 indicating the existence of a bad link; and
15 examining the link number field to determine the identity of the bad link;
16 at a linked device:
17 incrementing a value held in the device number field in a received INIT
18 command to form an incremented value and transmitting a modified INIT command having a
19 device number field holding the incremented value if an INIT command is received;
20 incrementing a value held in the link number field of a received LINK
21 command to form an incremented value and transmitting a modified LINK command having
22 a link number field holding the incremented value if a LINK command is received; and
23 transmitting a LINK command having a link number field holding the initial
24 value if no valid INIT or LINK command is received.

1 4. A system for determining a bad link in a ring of linked devices including a
2 start-up device and plurality of linked devices with each device in the ring including a
3 receiver and a transmitter, with the receiver of a particular device coupled to the transmitter
4 of a preceding device in the ring and with the transmitter of the particular device coupled to
5 the receiver of a following device in the ring, the system comprising:
6 a start-up device including:
7 means for transmitting a position command having a device number field
8 holding an initial value;

9 means for receiving a received position command having a device number
10 field holding a received value;
11 means for indicating that all links are good if the received value is equal to an
12 expected value;
13 means for indicating that a link is bad if the received value is not equal to the
14 expected value and indicating the location in the ring of a bad link based on the difference
15 between the received value and the expected value;
16 a linked device including:
17 means for incrementing a value held in the device number field of a received
18 position command to form an incremented value and transmitting a modified position
19 command having a device number field holding the incremented value if a position command
20 is received; and
21 means for transmitting a position command having a device number field
22 holding the initial value if no position command is received.

1 5. The system of claim 4 where all the devices on the management ring are
2 disposed on a platform and the platform includes a storage device indicating the number of
3 devices disposed on the platform, the start-up device further comprising:
4 means for reading a platform value from the storage device indicating the
5 number of devices in the ring; and
6 means for comparing the received value to the platform value to determine the
7 location of a bad link.

1 6. A computer program product, for determining a bad link in a ring of linked
2 devices including a start-up device and plurality of linked devices with each device in the
3 ring including a receiver and a transmitter, with the receiver of a particular device coupled to
4 the transmitter of a preceding device in the ring and with the transmitter of the particular
5 device coupled to the receiver of a following device in the ring, the computer program
6 product executed by controllers on the linked devices and comprising:
7 a computer usable medium having computer readable program code physically
8 embodied therein, said computer program product further comprising:
9 computer program code executed by a controller on the start-up device to
10 transmit a position command having a device number field holding an initial value;

11 computer program code executed by a controller on the start-up device to
12 receive a position command having a device number field holding a received value
13 computer program code executed by a controller on the start-up device to
14 indicate that all links are good if the received value is equal to an expected value;
15 computer program code executed by a controller on the start-up device to
16 indicate that a link is bad if the received value is not equal to the expected value and
17 indicating the location in the ring of a bad link based on the difference between the received
18 value and the expected value;
19 computer program code executed by a controller on a linked device to
20 increment a value held in the device number field of a received position command to form an
21 incremented value and transmitting a modified position command having a device number
22 field holding the incremented value if a position command is received; and
23 computer program code executed by a controller on a linked device to transmit
24 a position command having a device number field holding the initial value if no valid
25 position command is received.

1 7. The computer program product of claim 6 where all the devices on the
2 management ring are disposed on a platform and the platform includes a storage device
3 indicating the number of devices disposed on the platform, the computer program code
4 further comprising:

5 computer program code executed by the controller on the start-up device to
6 read a platform value from the storage device indicating number of devices in the ring; and
7 computer program code executed by the controller to compare the received
8 value to the platform value to determine the location of a defective link.

1 8. A system for determining a bad link in a ring of linked devices, said system
2 comprising:

3 a start-up device including:

4 a management interface having a transmitter and a receiver; and

5 a controller coupled to the transmitter to transmit a position command having
6 a position field holding an initial value and coupled to the receiver to receive a position
7 command having a position field holding a received value, where the controller compares the
8 received value to an expected value, indicates that all links are good if the received value is
9 equal to the expected value, indicates that a link is bad if the received value is not equal to the

10 expected value and determines the location of a bad link based on the difference between the
11 received value and the expected value;
12 a linked device including:
13 a management interface having a transmitter and a receiver; and
14 a management interface controller coupled to the receiver to receive a position
15 command from the first upstream device having a position field holding a received value,
16 where the controller increments the received value to generate an incremented value and with
17 the controller coupled to the transmitter to transmit a modified position command having a
18 position field holding the incremented value or, if no valid position command is received, the
19 controller transmits a position command having a position field holding the initial value.

1 9. A method for determining a bad link in a ring of linked devices including a
2 start-up device and plurality of linked devices with each device in the ring including a
3 receiver and a transmitter, with the receiver of a particular device coupled to the transmitter
4 of a preceding device in the ring and with the transmitter of the particular device coupled to
5 the receiver of a following device in the ring, the method executed at a supervisory device in
6 the ring comprising the steps of:
7 transmitting a transmitted position command having a device number field
8 holding an initial value;
9 receiving a received position command having a device number field holding
10 a received value
11 indicating that all links are good if the received value is equal to an expected
12 value; and
13 indicating that a link is bad if the received value is not equal to the expected
14 value and indicating the location in the ring of a bad link based on the difference between the
15 received value and the expected value.

1 10. A system for determining a bad link in a ring of linked devices including a
2 start-up device and plurality of linked devices with each device in the ring including a
3 receiver and a transmitter, with the receiver of a particular device coupled to the transmitter
4 of a preceding device in the ring and with the transmitter of the particular device coupled to
5 the receiver of a following device in the ring, the system comprising:
6 a start-up device including:

7 means for transmitting a position command having a device number field
8 holding an initial value;
9 means for receiving a received position command having a device number
10 field holding a received value;
11 means for indicating that all links are good if the received value is equal to an
12 expected value; and
13 means for indicating that a link is bad if the received value is not equal to the
14 expected value and indicating the location in the ring of a bad link based on the difference
15 between the received value and the expected value.

1 11. A computer program product, for determining a bad link in a ring of
2 linked devices including a start-up device and plurality of linked devices with each device in
3 the ring including a receiver and a transmitter, with the receiver of a particular device coupled
4 to the transmitter of a preceding device in the ring and with the transmitter of the particular
5 device coupled to the receiver of a following device in the ring, the computer program
6 product executed by controllers on the linked devices and comprising:

7 a computer usable medium having computer readable program code physically
8 embodied therein, said computer program product further comprising:

9 computer program code executed by a controller on the start-up device to
10 transmit a position command having a device number field holding an initial value;

11 computer program code executed by a controller on the start-up device to
12 receive a position command having a device number field holding a received value

13 computer program code executed by a controller on the start-up device to
14 indicate that all links are good if the received value is equal to an expected value; and

15 computer program code executed by a controller on the start-up device to
16 indicate that a link is bad if the received value is not equal to the expected value and
17 indicating the location in the ring of a bad link based on the difference between the received
18 value and the expected value.

1 12. A system for determining a bad link in a ring of linked devices, said
2 system comprising:

3 a start-up device including:

4 a management interface having a transmitter and a receiver; and

5 a controller coupled to the transmitter to transmit a position command having
6 a position field holding an initial value and coupled to the receiver to receive a position
7 command having a position field holding a received value, where the controller compares the
8 received value to an expected value, indicates that all links are good if the received value is
9 equal to the expected value, indicates that a link is bad if the received value is not equal to the
10 expected value and determines the location of a bad link based on the difference between the
11 received value and the expected value.